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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/929,714	08/13/2001	Andreas Falkenberg	2001P14844US	8927

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Siemens Corporation
Attn: Elsa Keller, Legal Administrator
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EXAMINER	
TORRES, JUAN A	
ART UNIT	**PAPER NUMBER**
2631	

DATE MAILED: 10/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/929,714	FALKENBERG, ANDREAS	
	Examiner	Art Unit	
	Juan A. Torres	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-12,14-17 and 19-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-12,14-17 and 19-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 3, 13, 18, 21 and 22 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 19 depends on claim 18 that has been cancelled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kosaka (US 5369378) (hereto referred to as Kosaka1). Kosaka1 discloses obtaining a pair of communication bits, and translating the communication bits into three bit communication bits (figure 9, column 6, lines 34-68, and column 7, lines 1-24); and mapping the three bit communication bits into DQPSK symbols (figures 3, 4 and 19 columns 7-9,column 10 lines 1-29). Kosaka1 doesn't specifically provide the look up table indicated in his claim. If the look up table provided by Kosaka1 in figure 3 is rotated PI/4 to locate point

a in the Q axis will result the same look up table that the one provided in this claim (see figures 3,4 and 19). This modification is obvious because is equivalent to the figure 3. The suggestion/motivation for doing so would have been to reduce the complexity of the computation locating some point in the axis so one of the coordinate is zero. Therefore, it would have been obvious to modify Kosaka1 to obtain the invention as specified in claim 21.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kosaka (US 5355092) (hereto referred to as Kosaka2) in view of Dutta (US 5313493) (hereto referred to as Dutta). Kosaka2 discloses obtaining Pi/4 differential quadrature phase shift keying (DQPSK) symbols (figure 4 column 2 lines 48-68); translating the Pi/4 DQPSK symbols into quadrature phase shift keying (QPSK) symbols; and mapping the QPSK symbols to a pair of bits (figures 6 and 22 column 15 line 58 to column 16 line 10). Kosaka2 doesn't disclose utilizing the formula $S_{QPSK}(t)$ = (real(S(t)) + imag(S(t)) * (real(S(t-1)) - imag(S(t-1))),where S(t) is a DQPSK symbol at time t, and $S_{QPSK}(t)$ is a QPSK symbol at time t. Dutta discloses translating the Pi/4 DQPSK symbols into QPSK symbols, using the formula s'(t)=s(t)*s(t-tau). Where s'(t) =S_{QPSK} (t), for tau=1 results that $S_{QPSK}(t) = S'(t) = S(t) * S^{*}(t-1)$ = (R(t) +j I(t)) * (R(t) + j I(t)) = (real(S(t)) + imag(S(t))) * (real(S(t)) - imag(S(t)));where real(S(t)) = R(t) and imag(S(t)) = j I(t)). Kosaka2 and Dutta teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the QPSK demodulator disclosed by Kosaka2 with the DPSK system disclosed by Dutta. The suggestion/motivation for doing so would

have been to obtain a well-known differential detector (Dutta column 6 lines 35-39). Therefore, it would have been obvious to combine Kosaka2 and Dutta to obtain the invention as specified in claim 22.

Claims 1, 2, 4, 5-12, 14-17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kosaka2 in view of Kosaka1, and further in view of Dutta.

As per claims 1 and 15, Kosaka2 discloses a method and apparatus for demodulation of a communication signal, using DQPSK. Kosaka2 discloses obtaining Pi/4 DQPSK symbols and translating them into QPSK symbols (figure 4 column 2 lines 48-68); mapping the QPSK symbols into a pair of bits (figures 6 and 22, column 15 line 58 to column 16 line 10). Kosaka2 does not teach utilizing the formula $S_{QPSK}(t)$ = (real(S(t)) + imag(S(t)) * (real(S(t-1)) - imag(S(t-1))),where S(t) is a DQPSK symbol at time t, and $S_{QPSK}(t)$ is a QPSK symbol at time t; obtaining communication bits indicative of the outbound communication signal, and translating the communication bits into three bits communication bits. Kosaka1 teaches mapping the three bits communication bits into DQPSK symbols. Dutta discloses translating the Pi/4 DQPSK symbols into QPSK symbols, using the formula s'(t)=s(t)*s(t-tau). Where s'(t) =S_{QPSK} (t), for tau=1 results that $S_{QPSK}(t) = S'(t) = S(t) * S^{*}(t-1) = (R(t) + j I(t)) * (R(t) + j I(t)) = (real(S(t)) +$ imag(S(t))) * (real(S(t)) - imag(S(t)));where real(S(t)) = R(t) and imag(S(t)) = j I(t)). Kosaka2 and Dutta teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the QPSK demodulator disclosed by Kosaka2 with the DPSK system disclosed by Dutta. The suggestion/motivation for doing so would

have been to obtain a well-known differential detector (Dutta column 6 lines 35-39). Kosaka1 discloses obtaining communication bits indicative of the outbound communication signal (figures 8 and 9; column 6, lines 34-68, column 7, lines 1-24, and Figure 9); and translating the communication bits into three bits communication bits (figures 8 and 9; column 6, lines 34-68, column 7, lines 1-24, and Figure 9). Kosaka1 teaches mapping the three bits communication bits into DQPSK symbols (figures 3, 4 and 19; columns 7-9, column 10 lines 1-29). Kosaka2 and Kosaka1 teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the QPSK demodulator disclosed by Kosaka2 with the DQPSK system disclosed by Kosaka1. The suggestion/motivation for doing so would have been to obtain a communication system must be capable of both receiving and transmitting a data signal. Therefore, it would have been obvious to combine Kosaka2, Dutta and Kosaka1 to obtain the invention as specified in claims 1 and 15.

As per claim 10 Kosaka2 discloses a method and apparatus for demodulation of a communication signal, using DQPSK. Kosaka2 discloses a processing unit (abstract and claim 1; and figure 6 block 23 and 25A; column 5 line 44 to column 6 line 21; and column 7 lines 12-24); and a storage device coupled to the processing unit (abstract and claim 1; and figures 6 and 10 block 25B-J; column 5 line 44 to column 6 line 21; and column 7 lines 12-24);obtaining Pi/4 DQPSK symbols and translating them into QPSK symbols (figure 4 column 2 lines 48-68); mapping the QPSK symbols into a pair of bits (figures 6 and 22, column 15 line 58 to column 16 line 10). Kosaka2 does not

teach utilizing the formula $S_{QPSK}(t)$ = (real(S(t)) + imag(S(t)) * (real(S(t-1)) - imag(S(t-1))),where S(t) is a DQPSK symbol at time t, and $S_{QPSK}(t)$ is a QPSK symbol at time t; obtaining communication bits indicative of the outbound communication signal, and translating the communication bits into three bits communication bits. Kosaka1 teaches mapping the three bits communication bits into DQPSK symbols. Dutta discloses translating the Pi/4 DQPSK symbols into QPSK symbols, using the formula s'(t)=s(t)*s(t-tau). Where s'(t) =S_{QPSK} (t), for tau=1 results that $S_{QPSK}(t) = S'(t) = S(t) * S^{*}(t-1)$ = (R(t) +j I(t)) * (R(t) + j I(t)) = (real(S(t)) + imag(S(t))) * (real(S(t)) - imag(S(t)));where real(S(t)) = R(t) and imag(S(t)) = j I(t)). Kosaka2 and Dutta teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the QPSK demodulator disclosed by Kosaka2 with the DPSK system disclosed by Dutta. The suggestion/motivation for doing so would have been to obtain a well-known differential detector (Dutta column 6 lines 35-39). Kosaka1 discloses obtaining communication bits indicative of the outbound communication signal (figures 8 and 9; column 6, lines 34-68, column 7, lines 1-24, and Figure 9); and translating the communication bits into three bits communication bits (figures 8 and 9; column 6, lines 34-68, column 7, lines 1-24, and Figure 9). Kosaka1 teaches mapping the three bits communication bits into DQPSK symbols (figures 3, 4 and 19; columns 7-9, column 10 lines 1-29). Kosaka2 and Kosaka1 teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the QPSK demodulator disclosed by Kosaka2 with

the DQPSK system disclosed by Kosaka1. The suggestion/motivation for doing so would have been to obtain a communication system must be capable of both receiving and transmitting a data signal. Therefore, it would have been obvious to combine Kosaka2, Dutta and Kosaka1 to obtain the invention as specified in claims 1 and 15.

As per claims 2, 11, and 17, Kosaka1 also discloses translating the communication bits comprises performing an XOR operation (figures 8 and 9 block 23A column 6, lines 34-68, column 7, lines 1-24).

As per claims 4 and 19, Kosaka2 also discloses that a phase of a first symbol is not known and a phase of a predecessor symbol is known (column 3 lines 43-64).

As per claims 5, 12, and 20, Kosaka2 also discloses using a look up table to map the QPSK symbols into a pair of bits (figures 6 and 22, column 15 lines 58-68, column 16 lines 1-10).

As per claims 6 Kosaka2 teaches using a look up table to map the QPSK symbols into a pair of bits (figures 6 and 22, column 15 lines 58-68, column 16 lines 1-10).

As per claim 7 Kosaka1 also discloses translating two communication bits to three communication bits using XOR, ADDER, and other gate logic in DQPSK modulation (figures 8 and 9 block 23C column 6, lines 34-68, column 7, lines 1-24).

As per claim 8, Kosaka1 also discloses teaches mapping the three bit communication bits into DQPSK symbols using a lookup table in DQPSK modulation (figure 8, 9 and 19, column 6 lines 34-68, and column 7, lines 1-24).

As per claims 9 and 16, Kosaka1 teaches a method of modulation that does not require a complex multiplication operation (Figures 9 and 19 column 6, lines 34-68, column 7, lines 1-24).

As to claims 14 Kosaka2 teaches using a look up table to map the QPSK symbols into a pair of bits (figures 6 and 22, column 15 lines 58-68, column 16 lines 1-10). Kosaka1 also discloses and translating the communication bits into three bit communication bits (figure 9, column 6, lines 34-68, and column 7, lines 1-24); and mapping the three bit communication bits into DQPSK symbols (figures 3, 4 and 19 columns 7-9,column 10 lines 1-29. See claim 22 above).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kelton (US 5745527 A) discloses an encoding method for constellation symbols of an RF transmitter using similar tables of the present application.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan Alberto Torres
10-24-2005

KEVIN BURD
PRIMARY EXAMINER